

dric, very densely punctate. Elytra densely and coarsely punctate, along the suture shorter than the thorax, at the sides about as long as the thorax. Hind body slender, elongate and cylindric, almost destitute of pubescence, very coarsely punctate. Male with a rather deep notch on the hind margin of the terminal ventral plate, and with the preceding segment slightly depressed along the middle and pubescent on each side of the depression.

Nikko, Tokio, Fukushima ; six specimens.

This is allied to *S. currax* and *S. sedatus*, but can be readily distinguished from the latter by the more slender form, intense black colour, and by the almost complete absence of pubescence on the hind body. *S. currax* has a differently formed head, comparatively obsolete punctuation on the hind body, and a remarkably conspicuous white pubescence on the basal segments of that part.

Stenus flavidulus, n. sp. (Sect. II. B, Erichson.)

Elongatus, angustulus, rufo-testaceus ; capite inter oculos, pectore abdominisque apice nigris ; antennis, palpis pedibusque flavis.
Long. 5-5½ millim.

Antennæ very long. Head black, red in front of the antennæ, not excavate but broadly and shallowly bisulcate, rather sparingly punctate. Thorax elongate, subcylindric, rather coarsely but not densely punctate. Elytra as long as the thorax and punctate like it. Hind body slender, elongate, very scantily pubescent, the basal segments sparingly punctate, the apical almost impunctate. Male with a large angular notch on the last ventral plate.

Honjo, in Tokio, under rushes with *Drypta fulveola*, an insect of somewhat similar colour ; in late autumn and early spring in plenty.

This species is very distinct on account of its colour. The only species I am acquainted with that are like it in this respect inhabit Ceylon.

[To be continued.]

XXXVIII.—Notes on some Buthidæ, new and old. By R. I. Pocock, of the British (Natural-History) Museum.

[Plate XV.]

THE conclusions set forth in this paper as to the validity of certain doubtful species of *Buthus* and the descriptions of the

new forms herein contained are based upon an examination of the large number of specimens of this genus which are contained in the collection of the British Museum.

On *Buthus Martensii*, Karsch.

Buthus Martensii, Karsch, Mitth. Münchn. ent. Ver. 1879, p. 112.

The conclusion of the diagnosis of this species is as follows:—"An forsitan masculum tantum *Buthi hottentottie* (Fabr.), cum qua specie magnam similitudinem habet; sed in permultis multorum locorum hujus speciei exemplis a me visis nullum digiti mobilis palporum lobo illo exstructum est."

Possessing but one male specimen wherewith to test the constancy of this character, Dr. Karsch was left in doubt as to the validity of the species described. An examination, however, of the specimens of *Buthus* contained in the British Museum has shown that *B. Martensii* is distinct from *B. hottentotta* and that the two may be readily separated by the following features:—

Buthus Martensii (Karsch). (Pl. XV. figs. 1, 1 a, 2.)

♂.—Hand thicker; fingers shorter.

Movable finger furnished with a conspicuous lobe, which fits into a corresponding excavation in the immovable finger.

Hand wider than forearm.

Length of "hand-back" about two thirds the length of the movable finger.

Width of hand a little less than one half the length of the movable finger.

♀.—Hand thinner; fingers longer.

Movable finger without lobe; immovable finger without excavation.

Hand narrower than forearm.

Length of "hand-back" about half the length of the movable finger.

Width of hand a little less than one third the length of the movable finger.

The type of this species (a male) was from Singapore.

The British Museum possesses nineteen specimens:—India (two females), Sikkim (one male), Umballah (two females), Bengal (two females, two males), Madras (three males, three females); and in addition four specimens (one male, three females) without locality affixed.

Buthus hottentotta (Fabr.). (Pl. XV. fig. 1 b.)

♂ ♀.—Alike in the form of the hand.

Movable finger with a feeble lobe which fits into a correspondingly feeble excavation in the immovable finger.

Hand about as wide as the forearm.

Length of "hand-back" more than half but less than two thirds of the length of the movable finger.

Width of hand considerably less than one half the length of the movable finger.

Of this species the British Museum possesses one specimen from Gambia, two from Shongo, two from the Niger, and also four adults and a number of young in various stages of growth from West Africa.

It will be noticed from the foregoing paragraphs that the last-named species occurs in Africa, while the other is Oriental, and that the African species, alike in its sexes, is intermediate between the male and the female of the Oriental species.

It seems very probable from the fact that *B. hottentotta* is intermediate between the sexes of *B. Martensii* that these two species have been hitherto confounded in museums under the name "*hottentotta*."

This belief is based in part upon the circumstance that the Marquis G. Doria has lately kindly presented to the British Museum two specimens of a *Buthus* from Bengal which had been identified in the Genoa Museum as *B. hottentotta*, Fabr. In reality these specimens are males of *B. Martensii*.

It will be interesting to discover to what extent, if at all, specimens from intermediate localities serve to fill up the structural interval which separates the African and Asiatic forms, and to learn thereby how valid is the conclusion that the two are to be ranked as distinct species.

On *Buthus confucius*, Simon. (Pl. XV. fig. 2 a.)

Buthus confucius, Simon, Ann. Soc. Ent. Fr. (5) x. p. 124.

The validity of this species has been called in question by Dr. Karsch (Berl. ent. Zeitschr. xxv. p. 219) while reporting upon a collection of Arachnida from China. In this collection was a species of *Buthus* from Peking which was referred to "*B. Martensii* (Karsch) (=syn. *Buthus confucius*, E. Simon?)."

There are, however, several reasons which lead me to think that Dr. Karsch has fallen into error in this instance. In

the first place it does not seem likely that a mistake should be made in the identification of a specimen of *B. Martensii*; for Dr. Karsch has made comparatively easy the recognition of his species by giving, in addition to a detailed description, a comparison between it and a form so well known as *B. hottentotta*, Fabr.

In the second place, Mons. Simon has made perhaps but little less certain the identification of *B. confucius* by adding at the end of the description of this species the following words:—"Très-commun sur les rochers de l'île du phare de Tchefou; également commun à Pékin" &c.

Now the British Museum possesses no less than thirty-five specimens of a species of *Buthus* which were brought by Col. Swinhoe from Pekin and Tchefou; and these specimens agree with the description of *B. confucius* sufficiently well to leave no doubt but that they are rightly to be called by that name. Moreover, as stated above, the Museum possesses a long series of Scorpions which agree precisely with the diagnosis of *B. Martensii*. But a comparison between these last and those from Pekin and Tchefou settles at once the question as to the points of similarity and difference between the two series, and shows that the points of difference are amply sufficient to justify their separation as distinct species; for all the specimens of *confucius* may be recognized at a glance from all the specimens of *Martensii* by the form of the fifth caudal segment. This segment in *Martensii* is beneath remarkably convex from before backwards and from side to side, and the carinæ are evenly granular throughout; posteriorly this segment is not constricted, and there is no conspicuous dilatation of it on each side of the vesicle. But in *confucius* the under surface of the fifth caudal segment is but little convex, and its armature is rather denticulate than granulate; the denticles on the posterior half of the keels being larger than those on the anterior half. Moreover the inferior surface is distinctly constricted behind and dilated into a conspicuous lobe. In addition to these features the two species may be separated by others almost equally well-marked; for instance the dorsal abdominal keels in *confucius* are much more complete and parallel than they are in *Martensii*, and the female of *confucius* has a much thicker hand.

Buthus socotrensis, sp. n. (Pl. XV. fig. 3.)

Colour very characteristic. The whole body, above and below, with palpi, legs, tail, and cephalothorax uniformly ochraceous, testaceous, or a combination of the two; the

distal end of the chelicerae, the area of the lateral and median eyes, and of the anterior cephalothoracic keels black.

The species bears considerable resemblance to *B. hottentotta* and *B. Martensii*, and undoubtedly appertains to that section of the genus of which *hottentotta* may be regarded as the type.

Cephalothorax.—Much the same shape as in *hottentotta*, but the median eyes are larger and considerably more widely separated; anterior keels not smooth between the eyes, diverging normally in front and joining each other in the middle line on the front edge of the cephalothorax; the area between them almost smooth. The posterior keels almost parallel, joining and being in almost the same straight line with the internal median keels, which are consequently themselves nearly parallel, the two on each side constituting only a slightly sinuous line; the external median keel not prominent and not united by a transverse line of tubercles with the anterior end of the posterior keel as it is in *B. europæus*. The rest of the cephalothorax sparsely granular.

Tergites.—The first six marked with three keels, although the lateral keels of the first may be represented by a single large granule only; these keels granular and becoming progressively more expressed from before backwards; the lateral diverging in front; but none of the keels are conspicuous on account of their being of the same colour as the rest of the segment; keels of the seventh segment like those of, *e. g.*, *B. hottentotta*.

Sternites as in *B. hottentotta*, except that the four keels of the fifth are of the same colour as the rest of the segment.

Tail.—Slightly narrowed from base to apex, considerably more shallowly excavated above than in *B. hottentotta*, *B. Martensii*, and *B. judaicus*; upper surface of the fifth segment with a shallow depression in its posterior half. The first four segments provided each with ten keels, for the most part feebly granular; the inferior keels, almost smooth in front, become more granular behind; the superior keels, on the other hand, become less granular behind; the inferior intercarinal spaces smooth behind and becoming more granular in front; the superior intercarinal spaces sparsely granular behind, more thickly so in front; on the fourth segment the granules of the upper surface are arranged in a definite longitudinal series, and constitute a distinct keel; consequently this segment, having a complete though feeble median lateral keel, is supplied with *twelve* keels. Fifth segment much like that of *B. hottentotta*, but less narrowed behind and less excavated above; superior keels absent, the segment being merely

granular above at the sides; inferior and lateral keels evenly granular throughout and nowhere denticulate; the granules of the inferior intercarinal spaces are arranged on each side in a definite series, thus constituting a keel, so that when viewed from below this segment appears to be furnished with five keels.

Vesicle large, dilated, its height being as great as or greater than its width and as great as or a little greater than the width of the anterior end of the fifth caudal segment; granular beneath; aculeus sharply curved backwards, considerably or a little shorter than the vesicle; together the two are about as long as the fifth caudal segment.

Palp.—Humerus almost as in *B. hottentotta*, except that the granules are finer; brachium not costate behind; superior keels very finely granular; anterior keels more coarsely granular. Manus not costate; a little narrower than the brachium and shorter than the dactyli; dactyli long, slender, incurved; the movable dactylus in one specimen about twice the length of the "hand-back," in the others considerably less so; the movable dactylus furnished with a small basal lobe. External surface of femora of legs granular.

Pectines (exclusive of the teeth) shorter than the cephalothorax; number of teeth 24–25 (♀?), in one specimen 28–29 (♂?).

All the appendages are hairy, mostly sparsely so, but on the manus and dactyli the hairs are very short and close-set; the anterior margin of the cephalothorax is furnished with a row of hairs, and on the under surface of the tail the hairs are few but symmetrically arranged.

Measurements in millimetres of largest specimen.—Total length 76, of tail 44, of cephalothorax 9; width 10; first tail-segment, length $5\frac{1}{2}$, width $5\frac{1}{2}$, height $4\frac{3}{4}$; fifth tail-segment, length $9\frac{1}{4}$, width $4\frac{3}{4}$, height $4\frac{1}{2}$; vesicle, length $6\frac{1}{4}$, width $4\frac{1}{4}$, height $4\frac{1}{2}$; palp, length of humerus 7, of brachium $8\frac{3}{4}$, width of latter 4; width of hand $3\frac{3}{4}$; length of "hand-back" $5\frac{3}{4}$, of movable finger $10\frac{1}{2}$; length of pecten $7\frac{3}{4}$.

Four specimens collected in the Island of Socotra by Prof. Baillie Balfour.

I am doubtful as to the sex of these specimens; possibly the one presenting twenty-eight pectinal teeth is a male; if so this variation in the number of pectinal teeth is the only noticeable character by which the sexes may be separated.

In the length of the fingers and slenderness of the hand this species somewhat calls to mind the female of *B. Martensii*; but the movable dactylus is furnished with a much

more conspicuous basal lobe than in the female of that species. It differs from both *B. hottentotta* and *B. Martensii* in its larger and more widely separated median eyes, in its more widely separated and more parallel posterior cephalothoracic carinæ, in its larger vesicle, and, above all, by the additional twelfth row of granules on the superior surface of the fourth caudal segment; this last is in fact a characteristic by which it may be separated from, I believe, all the species of *Buthus* that have been hitherto described, although it is at the same time a characteristic which is faintly foreshadowed in the reduplication of the series of granules which constitute the superior keels of the fourth and fifth caudal segments in some of the species allied to *B. liosoma*.

Buthus atlantis, sp. n. (Pl. XV. fig. 4.)

Cephalothorax almost exactly like that of *B. europæus*, except that the anterior granular keels are set a little nearer together; as in that species, the posterior keels are widely separated, very slightly converging, separated anteriorly by a smooth space from the internal median keel, but united by a conspicuous transverse row of tubercles with the well-expressed external median keel; and, further, between the posterior keel and the external margin of the cephalothorax there is an additional short series of granules corresponding in position with the fifth tergal keel of *B. quinque-striatus*.

Tergites as in *B. europæus*, each, except the first two, in which the lateral keels are obsolete, marked with three granular keels.

Sternites as in *B. europæus*.

Tail very different from that of the last-named species, long, slender, very shallowly excavated above. The first segment with ten well-expressed granular keels; the median inferior keels converging behind; the second segment with eight complete keels, the supernumerary median lateral keel being merely represented in the posterior half of the segment; the median inferior keels converging behind; third segment resembling the second, except that the supernumerary keel is still less developed, being represented merely by a few granules; in the fourth segment this keel is absent. The superior keels of these four segments are finely granular; the inferior keels more coarsely so than the superior, and becoming progressively more strongly expressed from behind forwards; the median inferior keels of the second and third segments are not denticulated as in *B. europæus*; all the intercarinal spaces are very finely granular. Fifth segment with very

shallow median depression above, a little depressed towards its hinder end, and a little constricted at the sides; dilated beyond the constriction into a tridentate lobe; inferior lateral keels becoming gradually more strongly dentate from behind forwards. Vesicle about the same form in proportion to the tail as in *B. europæus*, i. e. it is less globular; aculeus longer than in *B. europæus*.

Palp very like that of *B. europæus*; fingers very slightly incurved, nearly straight, the movable without a basal lobe, the immovable without an excavation.

Coxæ and *legs* hairy and granular, as in *B. europæus*.

Pectines with 25–26 teeth.

Measurements in millimetres.—Total length 89; length of cephalothorax $9\frac{1}{2}$, width 11; length of tail 56; first caudal segment, length 7, width 6, height $5\frac{1}{2}$; fifth caudal segment, length 11, width $4\frac{3}{4}$, height 4; length of vesicle 6, width $4\frac{1}{4}$, height 4; aculeus $5\frac{1}{4}$; length of humerus $7\frac{3}{4}$, of brachium $9\frac{1}{4}$, of "hand-back" 6, of hand 8, of movable finger $10\frac{1}{2}$; width of hand 4, of brachium 4.

A single specimen (sex unknown) from Mogador, collected and presented to the British Museum by Mr. C. A. Payton.

It is by the form of the tail alone that this species may be recognized from the well-known *B. europæus* (Linn.). This organ is much longer than in the latter species, being nearly six times as long as the cephalothorax; the inferior keels of the second and third segments are uniformly granular, the inferior lateral keels of the fifth become gradually dentate from before backwards, and the posterior lateral lobe of this segment is tridentate: the vesicle too is less globular, the aculeus longer and less curved.

Buthus Phillipsii, sp. n. (Pl. XV. fig. 6.)

Colour very variable; appendages and tail ochraceous or testaceous; hand of palp darker, with obscure paler longitudinal bands; tergites paler behind, darker in front; cephalothorax fuscous to testaceous. Eyes, anterior and posterior keels of the cephalothorax, keels of the tergites, and those of the hinder end of the under surface of the tail may be black or almost the colour of the rest of the plates, and there may be an additional black patch at the sides of the cephalothorax and of the tergites.

Cephalothorax finely granular all over except between the median eyes; granules between the anterior and posterior

keels smaller than upon the sides of the cephalothorax ; anterior keels granular, generally falling short of the anterior margin, rarely attaining it ; anterior margin bearing a series of granules and a few scattered hairs. Posterior keels converging in front and meeting the hinder extremities of the internal median keels, the two constituting a sinuous series of granules ; more rarely the extremities of these two keels fail to meet ; external median keel sometimes connected with the posterior keel by a more or less definite series of granules, but more commonly the granules in this part are neither larger nor more definitely arranged than upon the rest of the cephalothorax ; median eyes considerably in front of the middle of the cephalothorax.

Tergites sparsely but somewhat coarsely granular at the sides, smoother, but feebly granular above, each marked with the three ordinary keels, which are much abbreviated in front.

Tail large ; first four segments nearly parallel-sided, the fifth much narrowed at its hinder end ; the first four deeply excavated above ; the superior keels very conspicuous, being rather denticulate than granulate ; the inferior keels, nearly smooth on the first, become gradually more coarsely granulate from before backwards ; the median lateral keel, complete on the first segment, present on the hinder half of the second, represented by two or three granules in the third, absent on the fourth ; the intercarinal spaces are almost wholly smooth ; fifth segment above with a very shallow median excavation in front, but depressed behind, scarcely at all constricted at the sides, the posterior extremity of the side denticulate and continuous, or nearly so, with the denticles of the inferior lateral keels ; these denticles, like those of the median keel, almost alike throughout the extent of the keel ; in some cases, however, they vary slightly in size ; the median keel breaks up behind into a few lateral granules ; inferior intercarinal spaces furnished with a few more or less serially arranged large granules or tubercles ; all the segments of the tail are more or less hairy above and below, the hairs being long, widely separated, but arranged in definite longitudinal series.

Vesicle feebly granular beneath, and hairy, a little wider than the posterior end of the fifth segment of the tail, but narrower than its anterior end ; aculeus shorter than the vesicle, both together shorter than the fifth caudal segment.

Palp beset with longish separated hairs ; humerus and brachium with the ordinary granular keels ; hand obscurely costate, as in *B. europæus*, considerably wider than the brachium in male, as wide or wider in female ; dactyli short,

more incurved than in *B. europæus*; the movable dactylus in the male furnished with a large lobe, the immovable dactylus also with a large lobe, behind which is an excavation for the lobe of the movable dactylus; in the female there is a small but conspicuous lobe on the movable dactylus and a corresponding excavation on the immovable dactylus, but these two structures are much less well developed than in the male.

Legs and coxæ hairy and granular.

Pectines in male much larger than in female, being supplied with from 27–30 teeth and longer (without teeth) than the cephalothorax; in the female they have from 23–26 teeth and are shorter than the cephalothorax.

Measurements in millimetres of average-sized male.—Total length $47\frac{1}{2}$; length of cephalothorax $5\frac{1}{2}$, width $6\frac{1}{4}$; length of tail 32; first caudal segment, length $4\frac{1}{4}$, width $4\frac{1}{2}$, height 4; fifth caudal segment, length 7, width $3\frac{1}{2}$, height $3\frac{1}{4}$; vesicle, length $3\frac{1}{2}$, width $2\frac{3}{4}$, height $2\frac{1}{2}$; aculeus $2\frac{1}{2}$; length of humerus 5, of brachium $5\frac{1}{2}$, of "hand-back" $4\frac{1}{2}$, of hand 5, of movable digit $5\frac{1}{2}$; width of hand $3\frac{1}{2}$, of brachium $2\frac{1}{2}$; length of pecten $6\frac{1}{2}$.

A number of specimens of this species from Bushire were collected and presented to the British Museum by Mr. E. Lort Phillips.

Although this species bears a general resemblance to several others, it does not appear to present particular affinities with any one yet made known. The large size of the tail, together with the prominence and almost denticulate armature of its keels, not to mention the long hairs which adorn it, are perhaps the most noticeable of its features. In the form of these keels may be seen an approximation to the high compressed keels which characterize those Buthidæ belonging to the so-called genus *Androctonus*.

On *Buthus villosus*, Peters.

Buthus villosus, Peters, Monatsb. d. k. Preuss. Ak. Wiss. Berl. 1862, p. 26 Thorell, Etudes Scorpiol. p. 27.

Upon the occasion of drawing up a report upon a collection of Arachnida from Yemen, Mons. E. Simon (Ann. Mus. Genov. xviii. p. 244) sets down *B. villosus* (Peters) amongst the list of synonyms appertaining to *B. liosoma* of Ehrenberg; but scarcely rightly I think. For, in addition to some Arabian and several East-African specimens of a species of Scorpion which are undoubtedly referable to *B. liosoma*,

Ehrenb., the British Museum possesses others from Benguela and the Congo which are recognizable at a glance from *B. liosoma* and at the same time agree precisely with the elaborate description of *B. villosus* set forth by Dr. Thorell.

Perhaps the most noticeable points of difference are to be found in the form of the tail. This organ in *B. villosus*, instead of being dilated from the first to the fourth segment, as in *B. liosoma*, is distinctly wider at the base, the fourth segment being considerably narrower than the first. Moreover, while in *B. villosus* the first caudal segment is above more flat than it is in *B. liosoma*, the third, fourth, and fifth segments in the former are more deeply excavated than in the latter; the superior keels, too, are more dentate, particularly on the fifth segment; the vesicle and aculeus are larger. The colour of the body and limbs is much darker, the granules coarser, and, above all, the yellow hairs which are so conspicuous on various parts of the body, and particularly upon the tail, in *B. villosus* are only developed in *B. liosoma* to a relatively small extent.

In fact the characters of the two are sufficiently well marked to allow us to regard them as of specific importance.

Buthus planicauda, sp. n. (Pl. XV. fig. 5.)

Colour testaceous, ochraceous, or ochraceo-rufous; palpi and legs paler than trunk; the last three segments of the tail may be slightly deeper in colour than the rest.

Female.—*Cephalothorax* wider behind than it is long, much narrowed in front; anterior width about half its posterior width; marked with a median longitudinal depression, which is deeper behind, but shallower and gradually widened in front; entirely covered with close-set granules and marked with shallow lateral depressions; without a trace of keels. Ocular tubercle lightly hollowed, granular in the middle, smooth at the sides, situated in front of the middle of the cephalothorax.

Tergites finely granular, granules coarser upon the posterior half; each of the first six marked with a median keel; the last furnished with four anteriorly abbreviated granular keels, its upper surface shagreened.

Sternites almost wholly smooth; the first very slightly shagreened beneath the pectines on its extreme antero-lateral border; the last finely and sparsely granular at the sides and furnished with four slightly roughened keels.

Tail almost parallel-sided, the first and the fourth segments being equal in width; the first segment flat above

and shagreened, the second almost flat above, only very slightly depressed posteriorly, less shagreened than the first and more granular, bluntly keeled, the granules forming two parallel series at the sides of the upper surface; the third, fourth, and fifth conspicuously depressed, the third less than the fourth but more shagreened, the fourth less than the fifth but slightly shagreened and granular, the fifth being not shagreened. The first four marked with ten keels composed of rounded granules; the intercarinal spaces thickly granular; the inferior surface of the first segment less granular than that of the others; the granules of the keels are uniform in size; the superior keels of the fourth not consisting of two series of granules. The lower surface of the fifth segment thickly granular, with the median keel more or less strongly developed; the inferior lateral keels becoming bluntly dentate behind; this segment almost as elevated as the preceding.

Vesicle narrower than the fifth segment, covered beneath with larger and smaller blunt granules, and hairy; upper surface smooth, punctured; aculeus strong and gently curved; vesicle and aculeus together as long as or a little longer than the fifth caudal segment.

Palp.—Superior and anterior surfaces of humerus covered with fine granules and bounded by a row of larger granules; anterior surface, in addition, furnished with two irregular series of larger granules; inferior surface also finely granular; brachium very finely granular, not costate, with larger granules in front; manus slender, a little thinner than brachium; length of "hand-back" a little less than half the length of the movable finger; fingers long, incurved, without lobe or excavation. External surface of legs granular; the granules on the upper edges being arranged in longitudinal series. Coxæ quite smooth.

Pectines about as long as cephalothorax, furnished with 30–32 teeth; basal portion produced into a prominent lobe.

Male.—Manus round and thick, considerably thicker than brachium; "hand-back" a little more than two thirds the length of the movable finger; length of hand about equal to the length of the immovable finger; fingers not sinuous, but not in contact at the base when closed. Pectines longer than cephalothorax, with 35–38 teeth.

Measurements in millimetres of largest (♀) specimen.—Total length 78; length of cephalothorax $9\frac{1}{4}$, width $10\frac{1}{4}$; length of tail $49\frac{1}{4}$; first caudal segment, length $6\frac{1}{2}$, width 7, height 6; fifth caudal segment, length $6\frac{1}{4}$, width 6, height 5; vesicle, length 6, width 5, height 4; aculeus $5\frac{1}{2}$; length of

humerus 7, of brachium $7\frac{1}{2}$, of "hand-back" $3\frac{3}{4}$, of movable finger $8\frac{3}{4}$; width of hand 3, of brachium $3\frac{1}{4}$; length of pecten $9\frac{1}{4}$.

Five specimens:—two males from West Africa; three females, two from South Africa collected by Dr. Quain and Dr. Smith, and one, without locality, presented by Capt. Belcher, R.N.

This species is closely allied to *B. liosoma*, Ehr., and to *B. raudus* (Simon, Ann. Soc. Ent. Fr. (6) vii. p. 377), but differs from both in the flatness of the upper surface of the first two caudal segments and in the straightness of the keels which laterally bound this surface in the second segment; in *B. liosoma* these keels sensibly converge behind. Furthermore, the posterior segments are considerably higher and more deeply excavated than in *liosoma*, and the granules of the intercarinal spaces are smaller, more numerous, and more close-set.

Buthus limbatus, sp. n. (Pl. XV. figs. 7, 7a.)

Colour.—Middle of each tergite occupied by a wide black band; lateral portions testaceous or ochraceous; the extreme lateral border black; anterior portion of the cephalothorax from the median eyes to the lateral eyes black; posterior half above fuscous, at the sides ochraceous or testaceous; extreme lateral margin black. Upper and side surfaces of anterior four caudal segments ochraceous, of the fifth segment fuscous; under surface of fifth deep black, of the first four ochraceous, with four black keels; vesicle ochraceous, with a median dark line beneath, fuscous above and at the sides. Palpi, chelicerae, and legs ochraceous or testaceous; sternites and pectines testaceous.

Cephalothorax.—Anterior border slightly concave, narrowed in front, wider behind than long. Resembles that of *B. liosoma*, Ehr., in being without a trace of granular keels. The greater part covered with fine close-set granules; interocular area with a smooth median sulcus which can be traced in front and behind nearly to the anterior and posterior margins of the cephalothorax; in the posterior half from this smooth median tract proceed obscurely marked, smooth, transverse tracts, which extend over the lateral portions of the cephalothorax.

Abdomen.—First six tergites marked with but one median smooth keel in the hinder half; the rest of each very finely granular, with a coarser row on the hinder margin. Seventh

tergite marked in front with a low median keel and with two lateral, posteriorly converging, granular keels, which are not united in front by a transverse row of granules; intercarinal spaces finely granular.

Anterior four *sternites* perfectly smooth and marked in front with two obscure abbreviated sulci; the fifth bearing posteriorly four smooth keels, of which the two median are black.

Tail closely resembling in form that of *B. hottentotta*, Fabr., slightly attenuated towards the apex; the segments becoming progressively more hollowed from before backwards, the last being excavated behind almost as in *B. judaicus*, Simon. The first marked with ten complete keels, which, on the under surface, are much less sharply granular than on the upper surface; inferior intercarinal spaces smooth, superior very finely granular; second segment like the first, except that the median lateral keel is abbreviated in front; third segment smoother above than the first, with the inferior and lateral intercarinal spaces granular and the median lateral keel represented merely by an obscure line of fine granules; fourth segment smooth in the middle above, granular at the sides and beneath, entirely without, or at most with but the smallest indication of the median lateral keel; fifth segment not keeled above, merely granular; sides and under surface thickly covered with coarse granules; the inferior median keel more prominent than the inferior lateral keels; the blunt granules which mark the lateral keels becoming slightly larger towards the hinder end of the segment; the hinder end of the segment slightly constricted, then dilated into a feebly dentate lobe. Vesicle large, coarsely granular beneath, more finely at the sides, wider than the hinder end of the fifth segment, but narrower than its front end; a little thicker than it is high; longer than the aculeus, which is normally curved; vesicle and aculeus together a little longer than the fifth segment.

Appendages.—*Palp* (♀). Upper surface of humerus almost entirely smooth; bounded in front and behind by a conspicuous row of granules; anterior surface sparsely beset with small tubercles and bounded below by a row of granules; inferior surface smooth, posterior surface slightly roughened above; *brachium* not costate, sparsely granular in front; *manus* without keels or granules, punctured, shortly hairy, considerably thicker than the brachium; width of hand less than the length of the "hand-back"; length of "hand-back" less than the length of either finger; length of hand either equal to or a little less than the length of the immovable

dactylus; movable dactylus either a little longer than or equal in length to the brachium.

In the male the manus is thicker and the dactyli slightly shorter. External and inferior surfaces of the femora granular; coxæ perfectly smooth.

Pectines very large, without the teeth longer than the cephalothorax; projecting considerably beyond the edge of the posterior coxæ; furnished with twenty-six or twenty-seven long teeth, which are alike from base to apex in the male; but in the female the basal tooth is very much enlarged, being about twice as long as the rest and flask-shaped, *i. e.* dilated proximally and abruptly narrowed and slender distally.

Measurements in millimetres of largest specimen.—♀. Total length 58; length of cephalothorax $5\frac{1}{2}$, width $6\frac{1}{2}$; length of tail 31; length of first caudal segment 4, width 4, height $3\frac{1}{4}$; length of fifth caudal segment 6, width $3\frac{1}{2}$, height $3\frac{1}{4}$; length of vesicle $4\frac{1}{4}$, width 3, height $2\frac{3}{4}$; length of aculeus 4; length of humerus $4\frac{1}{4}$, of brachium $5\frac{1}{4}$, of "hand-back" $3\frac{7}{8}$, of movable dactylus $5\frac{1}{2}$; width of hand 3, of brachium $2\frac{1}{4}$; length of pecten (not including teeth) 6.

♂. Total length $45\frac{1}{2}$; length of cephalothorax 5, of tail $27\frac{1}{2}$, of pecten $5\frac{1}{2}$; width of hand 3, of brachium 2.

The male differs from the female in having the immovable finger excavated for the reception of a lobe on the movable finger, in having a thicker hand, and the pectinal teeth all alike.

Four specimens (three females, one male) from Madagascar, collected by the Rev. R. Baron.

In the absence of the cephalothoracic and of the lateral tergal keels this species resembles those belonging to the *B. liosoma* group. But in the form of the tail, which is slender and not strongly keeled, it is a *Buthus* sensu stricto. In fact between the two groups typified respectively by *B. europæus* and *B. liosoma* it constitutes one of the many structural links which show that for the latter group the generic name *Prionurus* cannot justifiably be retained. In addition to the interest attached to this species in this particular there is another feature which calls for special mention. This is the dissimilarity in size and shape existing in the female between the basal tooth of the pectines and those of the rest of the series. In this respect resemblance may be observed to the genus *Grosphus* of Simon (Ann. Soc. Ent. Fr. (5) x. p. 378)—a genus established partly on the strength of a similar

variation for the reception of *Androctonus madagascariensis* of Gervais (Arch. Mus. iv. p. 213, pl. xi. figs. 1-3).

The sexual nature of this variation in the pectinal teeth in the last-named species was to be inferred from the circumstance that the sexes of *Lepreus Fischeri* are to be distinguished by a similar variation, as pointed out by Dr. Karsch (Berl. ent. Zeitschr. xxx. p. 77); but the discovery of this new form, inhabiting as it does the same geographical area as *Grosphus*, and, moreover, closely allied to it, makes almost certain what could only be regarded as more or less probable before, and consequently serves considerably to weaken the basis upon which *Grosphus* was founded.

There is yet a third fact of special interest connected with this same Scorpion. In some species belonging to the *B. liosoma* group, to which, as above pointed out, *B. limbatus* appears to be allied, there is also in the female a variation in the structure of the pectines. But this, instead of being a difference in the appearance of the teeth, takes the form of a lobate dilatation of the base of the shaft which bears the teeth; and this dilatation in, e. g., *B. villosus* occupies the same position as does the dilated basal tooth of *B. limbatus*; so that clearly the same result has been attained in these two species by the modification of different structures, and therefore presumably independently in the two. The usefulness of some such modification could scarcely be more clearly demonstrated; but of its function I believe nothing is certainly known.

Buthus piceus, sp. n. (Pl. XV. figs. 8, 8a.)

Colour.—Dull black above, piceous, shining beneath; appendages and tail slightly paler than the trunk; pectines and distal tarsal segments of legs ochraceous.

Cephalothorax not furnished with keels, covered thickly with granules, not markedly attenuate in front; anterior border slightly concave; ocular tubercle situated well in the anterior half, with a shallow median sulcus; the portion of the cephalothorax which is in front of the tubercle is furnished with a very shallow median depression, but the portion behind the tubercle is deeply sulcate, the ordinary median sulcus being very strongly pronounced and giving off on each side about halfway between the ocular tubercle and the posterior margin a transverse sulcus, which, widening and deepening, extends to the lateral margin of the cephalothorax.

Tergites finely and closely granular; granules slightly larger in the hinder half of each; not furnished with three

keels ; the first is simple, the second shows faint indications of a posterior median granular keel and of a shallow depression on each side in front of it, features which become gradually more conspicuous until the sixth somite is reached ; seventh tergite with a conspicuous depression above in its posterior half, the median keel nearly obsolete, the lateral keels well shown and normal.

Sternites shining, smooth, the side margins only showing faint signs of granulation ; the last with the four series of granules very poorly developed. *Stigmata* small, short, almost ovate ; the sternal area surrounding them manifestly depressed.

Tail somewhat deeply excavated above, slightly attenuated ; the first and second segments furnished with ten keels, the third and fourth with eight ; keels very strongly granulate, almost denticulate ; the superior keels on the second, third, and fourth segments ending behind in a larger tooth ; superior intercarinal space nearly smooth ; the other intercarinal spaces more or less thickly covered with fine granules ; the fifth segment not lobate posteriorly, with keels evenly granulate throughout, closely resembling in fact that of, e. g., *B. hottentotta*.

Vesicle large, smooth above, coarsely, sparsely, serially tubercular beneath ; the terminal tubercle beneath the aculeus is much larger than the others. Aculeus shorter than the vesicle and gradually and gently curved.

Palp.—Upper surface of humerus, except for the granular keels which bound it in front and behind, nearly smooth ; anterior surface furnished with some smaller and a few larger granules ; brachium obsoletely keeled above, but not granular, sparsely but conspicuously dentate in front ; hand quite smooth, a little wider than the brachium, about as long as the immovable finger ; length of "hand-back" about one third shorter than the length of the movable finger, but considerably greater than the width of the hand. Legs supplied with the usual series of granules ; coxæ quite smooth.

Pectines short, about two thirds the length of the cephalothorax, furnished with 17–18 sharp teeth, which do not overlap each other ; the basal tooth of the series very large indeed, widened, lobate, with rounded margin, as in *Grosphus madagascariensis*, and not distally narrowed and dentiform, as in *B. limbatus*.

Measurements in millimetres.—Total length 62 ; length of cephalothorax $6\frac{1}{2}$, width $7\frac{1}{4}$; length of tail 36, of first two segments 9 ; width of first caudal segment $4\frac{1}{4}$, of fifth $3\frac{3}{4}$, length of fifth 7, of vesicle 5, of aculeus 3 ; width and height

of vesicle $3\frac{1}{2}$; length of humerus $5\frac{1}{4}$, of brachium $6\frac{3}{4}$; width of brachium and of hand 3; length of "hand-back" 5, of movable finger $6\frac{3}{4}$, of pecten $4\frac{1}{2}$.

Two female specimens from Madagascar, presented to the British Museum by Mr. Lewis H. Ransome.

In the shape of the pulmonary stigmata this species stands by itself in the family Buthidæ, and should in consequence perhaps constitute a new genus. But it does not seem to me advisable to attach generic importance to this character, since the form of the apertures in question is not quite constant in *Buthus* and the specimens presenting the peculiarity are in the rest of their features so essentially referable to that genus. The dilated basal tooth of the pectines appears to indicate affinity between this new form and *B. limbatus* and *G. madagascariensis*. But, apart from the stigmata, *B. piceus* may be separated from the latter by the dentition of the chelicere, from the former by its dark colour and by the simple shape of the before-mentioned pectinal tooth.

EXPLANATION OF PLATE XV.

- Fig. 1. Hand of *B. Martensii* (Karsch), ♂.
 Fig. 1 a. Ditto, ditto, ♀.
 Fig. 1 b. Hand of *B. hottentotta* (Fabr.), ♀.
 Fig. 2. Fifth caudal segment and vesicle of *B. Martensii* (Karsch).
 Fig. 2 a. Ditto, ditto, of *B. confucius* (Simon).
 Fig. 3. *Buthus socotrensis*, sp. n., nat. size.
 Fig. 4. *Buthus atlantis*, sp. n., nat. size.
 Fig. 5. Anterior two caudal segments of *B. planicauda*, sp. n.
 Fig. 5 a. Ditto, ditto, of *B. liosoma* (Ehrenb.).
 Fig. 6. *Buthus Phillipsii*, sp. n., nat. size, ♂.
 Fig. 7. *Buthus limbatus*, sp. n., nat. size, ♀.
 Fig. 7 a. The same. Basal portion of pecten.
 Fig. 8. *Buthus piceus*, sp. n. Basal portion of pecten.
 Fig. 8 a. The same. Second abdominal sternite with stigmata.

XXXIX.—*Descriptions of new Species of Rhopalocera from Mexico and Central America.* By F. D. GODMAN and O. SALVIN.

COLLECTIONS of *Rhopalocera* recently received by us from Mexico and other parts of Central America, as well as some submitted to us by Doctor Staudinger, contain representatives of the following species, which we believe to be undescribed.